As enclosed to IPER

Claims

1. A process for hydrogenating nitrile functions present in organic compounds over at least one heterogeneous catalyst, wherein the hydrogenation is carried out in the presence of an ionic liquid and the anion of the ionic liquid is selected from the group consisting of halides F^-, Cl^-, Br^-, I^-, acetate CH_3COO^-, trifluoroacetate CF_3COO^-, triflate $CF_3SO_3^-$, sulfate SO_4^{2-}, hydrogensulfate HSO_4^-, methylsulfate $CH_3OSO_3^-$, ethylsulfate $C_2H_5OSO_3^-$, sulfite SO_3^{2-}, hydrogensulfite HSO_3^-, chloroaluminates $AlCl_4^-$, $Al_2Cl_7^-$, $Al_3Cl_{10}^-$, tetrabromoaluminate $AlBr_4^-$, nitrite NO_2^-, nitrate NO_3^-, dichlorocuprate $CuCl_2^-$, phosphates, phosphate PO_4^{3-}, hydrogenphosphate HPO_4^{2-}, dihydrogenphosphate $H_2PO_4^-$, carbonate CO_3^{2-}, hydrogencarbonate HCO_3^-, sulfonate $-SO_3^-$, tosylate $p\text{-}CH_3C_6H_4SO_3^-$ and bis(trifluoromethylsulfonyl)imide $(CF_3SO_2)_2N$ and the ionic liquid contains phosphonium ions and/or at least one five- or six-membered heterocycle which contains at least one phosphorus or nitrogen atom and, if appropriate, a sulfur and/or oxygen atom.

2. A process according to claim 1, wherein a nonpolar ionic liquid is used in the case of a heterogeneous catalyst having a polar surface and a polar ionic liquid is used in the case of a heterogeneous catalyst having a nonpolar surface and/or ionic liquid and catalyst are chosen so that starting material or product reside in a different phase and/or irreversible occupation of the catalyst is prevented by the ionic liquid.

3. A process according to claim 1 or 2, wherein the ionic liquid has a melting point below 200°C.

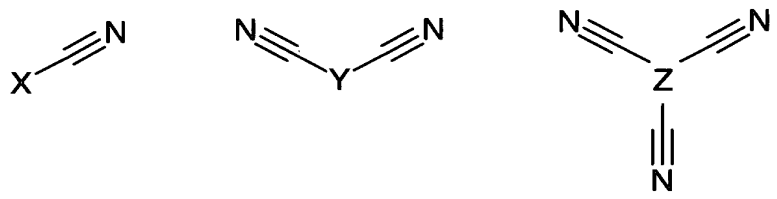
4. A process according to any of claims 1 to 3 carried out in the absence of ammonia.

5. A process according to any of claims 1 to 4, wherein, in the case of a suspension process, the catalyst and/or the ionic liquid are recirculated separately or together to the process or, in the case of a fixed-bed process, the ionic liquid is recirculated to the process.

6. A process according to any of claims 1 to 5, wherein a heterogeneous catalyst based on nickel, cobalt, copper, iron, ruthenium, rhodium, iridium, palladium and/or platinum is used, if appropriate as a skeletal catalyst.

7. A process according to any of claims 1 to 6, wherein the hydrogenation is carried out at a temperature of from 20 to 250°C and/or a pressure of from 1 to 300 bar.

8. A process according to any of claims 1 to 7, wherein the nitriles to be hydrogenated have at least one of the following structural units:



where X in the structural units is a linear, branched or cyclic group selected from the group consisting of alkyl, cycloalkyl, alkenyl, alkynyl, aryl, hydroxyalkyl, alkoxyalkyl, aminoalkyl and C_{1-4}-aryl and y and z are selected from the group consisting of alkyl, cycloalkyl, alkenyl, alkinyl, aryl, alkoxyalkyl and aminoalkyl.

9. The use of ionic liquids in hydrogenations of nitrile functions present in organic compounds over at least one heterogeneous catalyst, wherein the anions of the ionic liquid are selected from the group consisting of halides F^-, Cl^-, Br^-, I^-, acetate CH_3COO^-, trifluoroacetate CF_3COO^-, triflate $CF_3SO_3^-$, sulfate SO_4^{2-}, hydrogensulfate HSO_4^-, methylsulfate $CH_3OSO_3^-$, ethylsulfate $C_2H_5OSO_3^-$, sulfite SO_3^{2-}, hydrogensulfite HSO_3^-, chloroaluminates $AlCl_4^-$, $Al_2Cl_7^-$, $Al_3Cl_{10}^-$, tetrabromoaluminate $AlBr_4^-$, nitrite NO_2^-, nitrate NO_3^-, dichlorocuprate $CuCl_2^-$, phosphates, phosphate PO_4^{3-}, hydrogenphosphate HPO_4^{2-}, dihydrogenphosphate $H_2PO_4^-$, carbonate CO_3^{2-}, hydrogencarbonate HCO_3^-, sulfonate $-SO_3^-$, tosylate $p\text{-}CH_3C_6H_4SO_3^-$ and bis(trifluoromethylsulfonyl)imide $(CF_3SO_2)_2N^-$ and the ionic liquid contains phosphonium ions and/or at least one five- or six-membered heterocycle which contains at least one phosphorus or nitrogen atom and, if appropriate, a sulfur and/or oxygen atom.